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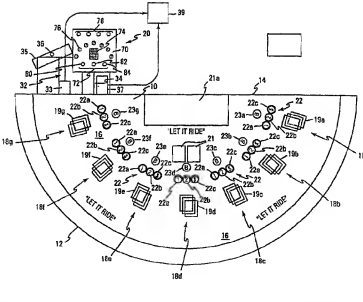

(57) Abstract: A security system for a casino table card game has a casino table (10) with i) indicia thereon for the placement of wagers (23a-23g), ii) a data entry system with an associated computer (33, 37, 39), and iii) sensors (22a, 22b, 22c) that can detect the placement of at least one specific category of wager; a shuffling device (32) with a microprocessor (33) integral to the shuffler for providing information from the shuffler in real time, receives information from the sensors (36), and receives information from the data entry system, the associated computer, the microprocessor and the central table gaming computer communicating data among each other in real time.

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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

CASINO TABLE MONITORING/TRACKING SYSTEM

1. Field of the Invention

The present invention relates to the field of casino gaming, casino table gaming, casino table card gaming, and the tracking and monitoring of the widest possible parameters of that gaming environment.

2. Background of the Art

The casino is probably the most controlled and secure environment frequented by people. To protect against cheating, there have been overhead walkways, floor walkers, pit bosses and other individuals acting as observers in casinos for many years. As technology has advanced, there are surveillance cameras in the casinos, at every conceivable location. These monitors have live viewers and videotaping to record evidence, and cover essentially every exposed area in a casino. The resolution on the cameras is sufficient to read the lettering on U.S. currency, even from cameras located twenty or thirty feet away.

The security objective in the casino is primarily aimed at protecting the casino against lost winnings because of cheating at the tables or slot machines. Although customers in the casino are also under surveillance to guard them against robbery or harm, the primary objective is definitely to protect the profit margin of the casino. As the profitably of play in the casino determines the bottom line of the casinos, controlling unnecessary losses is a reasonable objective.

In the play of casino table games where cards are used in play and chips or tokens are used to place wagers, two of the most significant venues for dishonesty are in switching cards, and in altering the value of chips placed as wagers. The skill of certain individuals in performing these tasks is at best difficult if not impossible to observe, the skill sometimes reaching the level of magicians in switching, palming, and adding chips and/or cards during play. Even under repeated scrutiny with video observation, the visual evidence is less than satisfactory against the most skilled cheats.

Additionally, when a dealer is operating in conspiracy with a player, the nature of the security violation can rapidly change at a table and will not be as readily observable as where the same type of illegal act is repeated. It is difficult to get physical evidence where such a conspiracy exits, as where dealer's cards are purposely exposed to provide a player with additional information, or the dealer is manipulating cards, as by withholding a group of cards from shuffling or positioning a preset group of cards so that a player will have a certain win.

Casinos are also less than thrilled with card counters at the blackjack table. Even though there are few individuals who can successfully and regularly practice this technique, and even though the skill is legal, there is evidence that a skilled card counter can win over one-hundred thousand dollars per year. Card counters are identified only by specific betting traits, and these have been observed by visual inspection of the tables.

To encourage higher gross levels of wagering by players, casinos often extend complimentary goods and services to players in exchange for more active wagering. This is conventionally known as "comping" and the casino operators award players "comps." Comps can be any redeemable forms of currency and/or currency equivalent typically issued (for promotional purposes) by casinos to their players in exchange for active, table game patronage. Such comps include points, club points, premium points, player club points, coupons (e.g., free meals, free rooms, free shows, free gifts, etc.), comp dollars and/or any other form of redeemable coupon, voucher, cash rebate, good or service.

Certain casinos offer players club cards. Players can insert the club card into a conventional slot machine and as the player plays the slot machine, tickets (or other comp credits) may be issued based upon the gross wagers made during the time the player plays the slot machine (e.g., one ticket whenever the accumulative wager equals $100). This is an example of one standalone comp awarding approach wherein the comp determination and the delivery of tickets are made at the slot machine.

A player entitled to comps or attempting to earn comps identifies himself/herself upon initiation of a gambling session (i.e., the period during which the player participates actively in a form of gambling). The casino then determines the

player's "gross session wager" (i.e., the total currency value put at stake by the player over the course of the gambling session). The casino multiplies the gross session wager by the house advantage (i.e., the percentage of total amount wagered that the casino can expect to win in accordance with the inherent statistical probability of a given game type), thus producing a theoretical expected win (i.e., the product of gross session wager multiplied by house advantage and usually expressed in units of currency). The casino then expresses the theoretical expected win as a currency value and multiplies the theoretical expected win by an internal percentage known as the comp factor (i.e., the percentage of theoretical expected win which the casino is willing to return to players in the form of complimentary goods and/or services--a typical range is fifteen to forty-five percent of theoretical expected win), thus producing available comp (i.e., the product of theoretical expected win multiplied by the comp factor which may be expressed as units of currency or point equivalents). The player then requests goods and/or services in exchange for his or her play at the gaming sessions. The casino determines the value of the goods and/or services requested and the player's available comp and provided that the available comp is sufficient, the good and/or service is delivered. The available comp is adjusted to reflect the value of the good and/or service delivered.

In conventional automated game machines such as slot machines, an accurate determination of available comp conventionally occurs. The player inserts the club card into a card-reading device at the gaming machine. The processor in the game machine communicates with a remote game machine management system (computer) and updates the specific player file in a system database. The player conducts the gaming session at the gaming machine and, during the gaming session, the processor updates the player file with the currency value of each game. The currency values accrue within individual player files, resulting in either periodic or real-time, positive adjustments to the gross wager balance for the player. When a player requests goods and/or service, the values of gross wager and house advantage (fixed percentage in slot machines) are inserted into the theoretical expected win equation. The comp factor (configurable by the casino) is then applied to the theoretical expected win, thus resulting in available comp for the player. The system determines the value of the

goods and/or service requested, as well as player's available comp. Provided that the available comp is sufficient, the good and/or service is delivered to the player and the available comp balance is decremented to reflect the value of the good and/or service delivered. Typical slot management and casino management systems that operate in the manner described above are conventionally provided in the gaming industry.

When attempting to determine available comp for live card table game players, however, casinos are dependent upon human assessments of both gross wager and house advantage. As a result, casinos approximate these variables. The player notifies casino personnel of his/her presence at the game table and presents a club card. A casino employee takes the club card and inputs it at a remote terminal, thereby updating the specific player file in the table system database. The player conducts the gaming session. A casino employee, usually a pit person, surveys the player's wagering activity periodically, making handwritten assessments of average wager on paper slips or cards. The player concludes the gaming session and leaves. Once a casino employee notices that a player has departed, the handwritten assessments of average wager are summed and divided by the number of manual assessments (e.g., $75+$50+$25/3 games=$50 per game). The casino employee updates the player file with average wager information by inputting it into the system and closes the pending gaming session for the player. The resident system establishes a gross wager by multiplying the observed average wager by session duration and a decisions per hour constant. In order to establish a surrogate measure of a player's gross wager, casinos multiply estimated average wager by both the number of hours played and a decisions per hour constant. This constant represents the casino's best guess as to the average number of decisions made by the average player over the course of an hour. Expressed mathematically, therefore, this process appears as follows: Gross Wager ($)=Average Wager ($) X Time X Decisions Constant. These wagering values accrue within individual player files, resulting in either periodic or real-time, positive adjustments to the gross wager balance. When determining a theoretical expected win, most represent house advantage with either a "worst case" or a "middle-of-the-road" percentage. In Blackjack, for example, the house advantage against a player of exceptional skill (worst case) is approximately 0.5% whereas the house advantage

over a player of poor skill may be as high as 3.0%. Although some table systems do provide for the manipulation of house advantage on an individual basis, this manipulation seldom occurs and house advantage becomes a constant in practice. The predefined comp factor is then applied to the theoretical expected win, thus resulting in available comp for the player. The resident system then determines the value of the good and/or service requested, as well as the player's available comp. Provided that the available comp is sufficient, the good and/or service is delivered and the available comp balance is adjusted to reflect the value of the good and/or service delivered.

A need exists to fully automate the player rating process at a live card gaming table in a casino to accurately rate the player and to reduce labor costs. Without question, player ratings based only on human observations are inaccurate. Supervisors can easily over-assess or under-assess a particular player's rating. Furthermore, the labor costs for the supervisors are expensive.

Systems are conventionally available to assist operators in player rating determinations. However, these systems are still dependent upon subjective assessments of time played, average wager, and house advantage. A need exists to eliminate the "subjectiveness" in these assessments.

Some systems provide automated equipment for tracking a player's betting activity. Examples of manufacturers who offer such automated equipment include Precision Resource Corporation product trademarked PITRAK (U.S. Pat. No. 5,613,912) and Grips Systems Inc. product trademarked GOLDEN EYE (WO 97/10577). These systems provide rail-based card reading units in order to allocate accurately the length of time the player is at the gaming table. However, these systems are still dependent upon the subjective assessment of average wager and house advantage. A need exists to completely automate this feature.

A need has been recognized to reward players comps for their gaming activity at a game table based upon an accurate determination of a player's wagering activity. A need exists to deliver room, food, and other such comps to players of table games based upon such accurate determinations.

U.S. Patent No. 6,267,671 describes a comp rating system for a player at a game table upon which a live card game is played, the game table having a player

position, the game table having a wager area at the player position, the comp rating system comprising: a player data medium, the player data medium having player identifying data, a reader at the player position, the reader obtaining the player identifying data from the player data medium when the player data medium accesses the reader, a wager having at least one wagering device placed at the wager area, each of the at least one wagering device having value identifying data, a decoder at the game table receiving the value identifying data from the at least one wagering device placed at the wager area, the decoder determining a value of the wager for each live card game played at the game table, a first computer at the game table, the first computer connected to the reader and the decoder, the first computer generating a table record containing the player identifying data, and the wager value for each live card game, the first computer determining a gross session wager value when the player data medium is removed from the reader, a player database record containing a player history record updated by the first computer, a second computer connected to the player database record, the second computer receiving the table record and the player history record from the player database record upon receiving a comp request, the second computer determining whether the comp request is available, a network including at least the second computer, a host management system, a junket agent compensation request having at least one player identification, the host management system accessing the player history record from the player database record when the player history record matches the at least one player identification in the junket agent compensation request, thereby selecting only the player history record required to compensate a junket agent.

U.S. Patent No. 6,270,404 discloses a fully video table game system comprising systems and methods for playing live casino-type card games, in particular blackjack. The systems include a presentation unit having video displays which portray virtual playing cards and other information at gaming tables attended by live participants. Shuffling, cutting, dealing and return of playing cards are accomplished using data processing functions within an electronic game processor or processors that enable these functions to be performed quickly and without manual manipulation of playing cards. The invention allows casinos to speed play and reduce

the risk of cheating while maintaining the attractive ambiance of a live table game. This system has a single table computer and possibly a central reporting computer, but also suffers from the fact that many players still prefer the use of physical cards during play of casino table games. U.S. Patent No. 6,257,981 describes a system for monitoring and configuring gaming devices interconnected over a high-speed network. The system can support a file server, one or more floor controllers, one or more pit terminals, and other terminals all interconnected over the network. Each gaming device includes an electronic module that allows the gaming device to communicate with a floor controller over a current loop network. The electronic module includes a player tracking module and a data communication node. The player tracking module includes a card reader for detecting a player tracking card inserted therein which identifies the player. The data communication node communicates with both the floor controller and the gaming device. The data communication node communicates with the gaming device over a serial interface through which the data communication node transmits reconfiguration commands. The gaming device reconfigures its payout schedule responsive to the reconfiguration commands to provide a variety of promotional bonuses such as multiple jackpot bonuses, mystery jackpot bonuses, progressive jackpot bonuses, or player specific bonuses.

U.S. Patent No. 6,234,900 describes a system and method for tracking the play of players playing gaming devices such as slot machines through passive identification of the players. Passive identification can be achieved by analysis of a player, such as facial image photography, infrared scan, scans of a player's iris or other features of the eye, and the like. Players provide identification information and physical recognition data is acquired as by a digital or video camera. For each player an account file and a file of the image data is stored. When the player plays the slot machine, a camera scans the player and acquires image data that is compared to stored data to identify the player. The identified player's account file is opened and data from the device representing parameters of play, e.g., amounts wagered, is allocated to the identified player's account file for the purpose of providing comps and other benefits to the player. "Doe" image data and account files can be stored to allocate parameters

for unidentified players. Further the device acquired image data can be compared with stored image data to identify undesirables such as slot cheats or the like.

U.S. Patent No. 6,186,895 describes an intelligent casino chip system. At least one gaming table is provided with at least one discrete player area. Each player area has a discrete betting area. Two classes of intermingled gaming chips are accepted in a stack in the discrete betting area. The gaming chip of the first class, comprising the primary wager, has a first transponder containing at least value information. The gaming chip of the second class, comprising the secondary wager, has a second transponder containing value and class information. A transceiver system located on the gaming table within the vicinity of the betting area is used to receive value signals from the first transponder and transponder value and class signals from the second transponder. These signals are conveyed to a computer system that then determines a primary wager value of the primary wager based on the value signals from the first transponder. The computer system also determines the secondary wager value as distinct from the primary wager value based on the value and class signals from the second transponder. Thus, the computer is provided with the respective wager values and the distinct class of the secondary wager when the primary wager and the secondary wager are intermingled within the discrete betting area. Similarly, U.S. Patent No. 5,781,647 describes a computer implemented gambling chip recognition system having the ability to capture an image of a stack of gambling chips and automatically processing the image to determine the number of chips within the stack and the value of each. The system processor determines the classification for each chip in a stack by way of processing performed in real time on the image of the stack of gambling chips. The system further includes the ability to communicate the information derived from the stack of gambling chips to a video monitor and the ability to communicate the information to a main database where information is being compiled and stored about an individual gambler.

U.S. Patent No. 5,735,742 also describes a chip tracking system wherein a fully automated accounting system accurately and automatically monitors and records all gaming chip transactions in a casino. The system employs a gaming chip having a transponder embedded therein and has an ongoing and "on-command" ability to

provide an instantaneous inventory of all of the gaming chips in the casino, including those in storage in the vault as well as the chips in the cashiers cage and at each gaming table on the casino floor. The system is capable of reporting the total value of the gaming chips at any location, as well as the value of any particular transaction at any gaming table or at the cashier's cage. Optionally, the transaction history of each chip may be maintained in a data base embedded in the chip (or alternatively in a central computer), and read each time the gaming chip is scanned by a special antenna. If the chip is not where it is supposed to be according to its recorded transactional history (for example, a vault chip shows up on a gaming table without having passed through the cashiers cage), it will be identified and may be invalidated by nullifying a special casino security code. U.S. Patent No. 5,651,548 describes a system whereby radio signals or RF responses from individual chips are tracked throughout a casino. U.S. Patent No. 6,200,218 describes a chip tracking system in trays on a casino table.

U.S. Patent No. 6,183,362 describes a system and method for implementing a customer tracking and recognition program that encompasses customers' gaming and non-gaming activity alike at a plurality of affiliated casino properties. Customer information is accumulated at each affiliated casino through one or more LAN-based management systems, updated to a central patron database (CPDB) that is coupled to each casino LAN through a WAN, and made available to each affiliated casino property as needed. Customer accounts are automatically activated and provided with data from the CPDB when a customer from one casino property first visits an affiliated casino property. Customer accounts are updated with new activity data whenever a management system associated with the casino receives customer data from input devices, such as card readers, workstations, and dumb terminals, located at various venues throughout the casino. Customers are awarded points, based on their tracked activity at all affiliated casino properties. The point awards have a monetary value and are redeemable for gifts, meals, cash and the like, at any of the casino properties. The point awards may embody different promotional schemes in which point awards are adjusted to target different casino properties or different venues within a casino. Summary customer data, including point levels, is regularly updated

to reflect ongoing customer activity at the casino property. This data is made available to employees at any affiliated casino property, as needed, to personalize customer services.

U.S. Patent No. 6,165,069 describes a system and method for playing live casino type card games, in particular blackjack. The systems include a presentation unit that has video displays which portray virtual playing cards and other information at gaming tables attended by live participants. Shuffling, cutting, dealing and return of playing cards are accomplished using data processing functions within an electronic game processor or processors that enable these functions to be performed quickly and without manual manipulation of playing cards. The invention allows casinos to speed play and reduce the risk of cheating while maintaining the attractive ambiance of a live table game.

U.S. Patent No. 6,154,131 describes a system of sensors to prevent cheating at a casino gaming table, where the sensors are strategically positioned about a casino gaming table to monitor the movement about certain established areas on the gaming table during certain established times during the play of the game. The tripping of a sensor in response to the detection of unauthorized movement about a certain area of the table sends a signal to a monitoring system which in turn alerts the casino so that the casino may respond to the unauthorized movement accordingly. The system of sensors can be used with a wide variety of card-based or chip-based casino gaming tables.

U.S. Patent No. 6,126,166 describes a system for monitoring play of a card game between a dealer and one or more players at a playing table, comprising: (a) a card-dispensing shoe comprising one or more active card-recognition sensors positioned to generate signals corresponding to transitions between substantially light background and dark pip areas as standard playing cards are dispensed from the card-dispensing shoe, without generating a bit-mapped image of each dispensed standard playing card; and (b) a signal processing subsystem adapted to: receive the transition signals generated by the active card-recognition sensors; determine, in real time and based on the transition signals, playing-card values for the dispensed standard playing

cards; and determine, in real time, a current table statistical advantage/disadvantage relative to the players for playing cards remaining in the card-dispensing shoe.

U.S. Patent No. 6,093,103 describes a secure game table system, adapted for multiple sites under a central control, for monitoring each hand in a live card game. A common deck identity code is located on each card. A shuffler has a circuit for counting the cards from a previous hand which are inserted into the shuffler and which reads the common identity code. The game control verifies that no cards have been withdrawn from the hand by a player or that new cards have been substituted. A unique code also placed on each card is read as the card is dealt to indicate the value and the suit. The game control stores this information in a memory so that a history of each card dealt is recorded. Sensors are located near each of the player positions for sensing the presence of a game bet and a progressive bet. A card sensor located near each player position and the dealer position issues a signal for each card received. The game control receives these signals and correlates those player positions having placed a game and/or progressive bet with the received cards. The game control at each table has stored in memory the winning combinations necessary to win the progressive jackpots. Since the game control accurately stores the suit and value of each card received at a particular player position, the game control can automatically detect a winning progressive combination and issue an award signal for that player position.

U.S. Patent No. 6,071,190 describes a gaming device security system that includes two processing areas linked together and communicates critical gaming functions. These functions are communicated via a security protocol wherein each transmitted gaming function includes a specific encrypted signature to be decoded and validated before being processed by either processing area. The two processing areas include a first processing area having a dynamic RAM and an open architecture design which is expandable without interfering or accessing critical gaming functions and a second "secure" processing area having a non-alterable memory for the storage of critical gaming functions therein. The gaming machine may comprise, in combination: a first processor having open architecture including internal alterable program storage media, a visual display coupled thereto visually accessible to a player

and a communication interface; a second processor having a secure processing area and having means for retaining regulatory validation, a static, non-volatile random access memory, a non-alterable read only memory and means for sending encrypted communicating data to said first processor via said communication interface, the second processor having means for sensing wagering activity and means for transmitting a random gaming outcome to said first processor to be posted on the visual display, the second processor provided with means to bestow credits as a function of the random gaming outcome.

Many different card delivery shoes and shuffling devices have been disclosed in which card reading capabilities are provided, and by intuition or estimation, hand reading capability has been provided. An example of that type of apparatus is found in U.S. Patent No. 6,039,650. That patent discloses a playing card dispensing shoe apparatus, system and method wherein the shoe has a card scanner that scans the indicia on a playing card as the card moves along and out of a chute of the shoe by operation of the dealer. The scanner comprises an optical-sensor used in combination with a neural network that is trained using error back-propagation to recognize the card suits and card values of the playing cards as they are moved past the scanner. The scanning process in combination with a central processing unit (CPU) determines the progress of the play of the game and, by identifying card counting systems or basic playing strategies in use by the players of the game, provides means to limit or prevent casino losses and calculate the Theoretical Win of the casino, thus also providing an accurate quality method of the amount of comps to be given a particular player. The shoe is also provided with additional devices which make it simple and easy to access, record and display other data relevant to the play of the game. These include means for accommodating a "customer-tracking-card" which reads each player's account information from a magnetic strip on the card, thus providing access to the player's customer data file stored on the casino's computer system and one or more alpha-numeric keyboards and LCD displays used to enter and retrieve player and game information. Also included are keyboards on the game table so that each player can individually select various playing or wagering options using their own

keyboard. U.S. Patent No. 5,722,893 also describes a shuffler/shoe with card reading capability.

U.S. Patent No. 5,919,090 describes a method and apparatus for determining the win or loss of individual participants in a game of chance, such as for example Black Jack, Poker or the like, wherein the bet and the winnings are represented by chips. A central chip depository is provided for receiving the game inventory and the latter has means for determining its momentary content. At least one chip deposit area is provided per participant and has in each case at least one sensor for the detection of chips lying on the deposit area. The means for determining the momentary chip content and also the sensors have their outputs connected to the inputs of a data processing system.

U.S. Patent No. 5,613,912 describes a complex player tracking system in which there is automatic tracking of the betting activity of casino patrons at gaming tables and providing an indication of this betting activity to casino personnel in real time. Casino patrons use magnetic cards to check themselves in and out of the bet tracking system through magnetic card readers located at each betting position of a gaming table. Customer identity and location codes are coupled from the gaming table to a computer system using a wireless communication network. The computer system uses the codes to retrieve customer information, to estimate an average bet for the patron based on the current minimum table bet for the gaming table and the time period of the patron's play, and to calculate periodically an average theoretical win based on the patron's play. This information is made available through the casino computer system to casino personnel at the patron's gaming table and at any other gaming table to which the patron moves. The information available to the casino personnel is updated periodically to reflect the patron's accumulated betting activity. Similarly, U.S. Patent No. 5,586,936 describes an automated gaming table tracking system for a gaming table, such as blackjack. A sensor located in the dealer's card playing area senses the start and end of each game. A unique player identity card is given to each player that contains information on the player. When a player arrives at a player position on the table, the player inserts his player identity card into a player station control at the player position. A central distribution control is connected to

each player station control for determining the start and the end of each game and beginning and termination of play by each player at each position. A host computer is then interconnected to the central distribution control for storing the player identity information and the player position for each player station control, the start and end of each of the games, and the beginning and termination of play at each player position from the central distribution control. The host computer prints a player tracking card. The floor supervisor observes the player during the game and fills out the in-session gaming information. Once the player leaves the table, the player tracking card with the in-session gaming information filled out is then placed in an automatic reader so that the read in-session gaming information is stored in a data base corresponding to the identity of the player.

The LET IT RIDE BONUS® poker system is one commercial system that provides live table game security. The system includes a general purpose game computer (typically shared by multiple tables), a programmable keypad computer and an intelligent card shuffler. Each computer component, however, has limited communication capacity among each other and the intelligence of the shuffler has been limited. A description of the components and their operation is provided below as an admission of prior art.

Keypad Computer & Controls---When a player achieves a preselected winning bonus hand, the dealer inputs this information into the keypad controller. The keypad allows the dealer to start/end a game. The keypad controller receives signals from the side bet detectors (e.g., sensing that a side bet has been placed) and transmits the information to the central game computer. The keypad controls verify security keys. Physical "keys" are inserted by the dealer into the keypad controller as an extra security measure prior to paying a large payout. Often, the pit boss carries the keys and must physically verify the hand and payout before the key is used. The use of the "key" system allows verification of selected high-ranking bonus hands (i.e., a royal flush). When a winning bonus hand is achieved, the dealer inputs the position number of the winning hand into the keypad. The keypad computer verifies that an original bonus bet (side bet wager) was registered to that position. Chip sensors in the table area associated with the side bet wagers communicate with the keypad only. The

keypad controls currently can communicate over fiber optic or copper cables to the game computer. The keypad computer can communicate with other hardware devices (such as a progressive meter, CRS (card revelation monitor system for display of symbols such as a card to be matched or indication of a wild card) system, with a random number generator or a sign. During setup, the keypad computer can be programmed for different games, pay tables, etc. During setup, the keypad computer is set to select music (on/off) that may indicate a bonus award. The keypad sends this information to the game computer, and the game computer controls the audio system.

Shuffler—The currently marketed technology permits the shuffler to communicate only with the keypad controller. The shuffler tells the keypad in real time how many cumulative hands have been dealt. Misdeal information is also transmitted from the shuffler to the keypad. The presence of the shuffler is verified by sending a signal to the keypad controller. The keypad controller continually polls for the presence of the shuffler. Once the presence of the shuffler is confirmed, control of some aspects of shuffler operation (such as when to deal cards) is taken over by the keypad controller. The keypad computer tells the shuffler when it is time to deal another round, and tells the shuffler when all bets have been placed and dealing can proceed.

General Purpose Game Computer—This computer is typically shared by multiple tables. It receives no information from the shuffler. It receives on/off line status of game from the keypad controller. Key code information (to verify a high ranking winning hand) is verified on the central computer. The central computer assembles reports of data, including the number of hands/bets/rounds (or games), game identification (that is, what game is being played on the shuffler), table identification (that is, which table is being used), bonus hands won, win/(unit time), hands/(unit time), and bets/(unit time).

Each of these areas of security and capabilities at casino gaming tables have been independently provided, or provided as grouped features. The failure to appreciate the interrelationship of some of these individual tasks and the failure to integrate them into a single piece of table game equipment has weakened the overall benefit to the casino.

SUMMARY OF THE INVENTION

A secure casino table gaming system and method of use that is designed to maximize casino security with regard to play of the table game comprises a multicomponent, multi-intelligence set of components that communicate in real time to assess the many facets of events that occur at a gaming table. The assessment provides evidence of the occurrence of significant events and provides a complete record of events in play at a table, significantly reducing the opportunity for individuals or groups to cheat at a gaming table without being observed.

At a minimum, at least two and preferably at least three microprocessors (computers, or other intelligent apparatus) are associated at a casino table with a card game. One microprocessor is specifically associated with a shuffling and/or randomizing/dealing apparatus (generally referred to herein as "shufflers" and e.g., Shuffle Master gaming, Inc.'s Ace, King and other newly developed shufflers) to provide real time information including at least some of (and preferably all of) the number of cards that have been shuffled, the authenticity of cards in the shuffler, the number of times that a shuffling sequence of complete shuffle has been performed, the rank and value of specific cards being fed out of a section of the shuffler, the number of cards in the shoe (the delivery section of a shuffler), the rank of specific hands provided to each player, and the like.

Another microprocessor and/or game computer is directed towards game control function and is referred to herein as the Table Game Controller or Table Game microprocessor. The Table Game Controller identifies game functions and preferably includes some or all of wager amounts (provided by detectors, such as weight sensitive detectors, scanning detectors, manual input, proximity detectors, RF reading from embedded signaling systems, etc.), entry and/or recognition of side bet wagers, amounts wagered on side bets (e.g., from detectors), presence of a player at specific positions, identity of a player at specific locations (from a player tracking system), wagering activity at a position, results of each game (based on information fed to it from the shuffler microprocessor or from a table scanner), the frequency of wins at specific positions, the frequency of bonus or jackpot events, and the like.

The third possible microprocessor (or the functions that must be combined in the performance of one or both of the other microprocessor already described) include player identification, dealer identification, betting pattern recognition software, betting pattern recordation, win/loss records and real time tallies, time of play and play rates and wagering rates, table identification, game histories, play histories, play versus time of day data, replacement times of dealers, replacement times and status of shufflers, and the like. This information can be compared and evaluated in real time, with real time communication among all of the microprocessors, to signal the occurrence of unusual events, track players, track dealers, track margins at tables, and identify a whole range of events that are desirable in maintaining casino security.

BRIEF DESCRIPTION OF THE FIGURES

Figure 1 shows a casino card gaming table configured to play Let It Ride Bonus® stud poker according to one aspect of the present invention.

Figure 2 shows a series of casino card gaming tables configured to play Let It Ride Bonus® stud poker and communicating with a single central computer according to one aspect of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

The card table game monitoring and security apparatus of the present invention comprises at least two distinct computers, preferably at least three computers associated with specific elements and communicating in real time. The systems of the present invention includes a main table game controller, and will have a shuffler with its own intelligence and a keypad without its own intelligence, communicating directly with a main table game controller and possibly other table game controllers. The table game controller communicates with a main controller. The main controller is a general purpose computer and collects data from a group of game tables and/or groups of games and their tables in real time. In one form of the invention, the table game controllers share information and are in direct communication, or communication through the central controller. Typically, multiple table games of the same or of a different type are connected to the main controller. The main controller in the practice of this invention receives data from each of the table controllers, including player tracking, betting information, card identification,

dealer information, player information, table location, and on a progressive system, the shared progressive amount.

The system and its use may be variously and generally described as a method of controlling a live casino table card game; comprising: sensing wagers by players at at least two player locations and communicating the sensing to a table game control computer in real time and communicating the sensing to a central control computer in real time; controlling an automatic card shuffling device with a microprocessor in the card shuffling device and communicating information relating to card shuffling to the game table controller computer in real time and to the central control computer in real time; and electronically measuring betting information and transmitting information to the central game controller computer in real time, said electronic measuring including use of data transmitted to the central game controller computer from the table game controller computer and the shuffler.

Alternative general descriptions include a method of controlling a live casino table card game; comprising: providing a live gaming table with at least two player locations and at least one sensor in each player location for sensing bets; providing a computer controlled automatic card shuffling device; providing a table game controller; and providing a central game controller; electronically measuring betting information, wherein the card shuffling device receives game related data from and/or transmits data to the table game controller in real time and wherein the table game controller transmits and/or receives game related information in real time to and/or from the central game controller.

Another aspect of the invention includes an automatic card shuffler, comprising: A programmable controller; A card randomizing mechanism; and a data port; wherein data is fed from outside the card shuffler via the data port into the programmable controller from a central game computer and/or table game computer, and/or data collected by the controller is fed outside the card shuffler via the data port to a central game computer and/or table game computer.

A still further aspect of the invention is a security system for a casino table card game comprising: a) a casino table with i) indicia thereon for the placement of wagers, ii) a data entry system with an associated computer, and iii) sensors that can

detect the placement of at least one specific category of wager; b) a shuffling device with a microprocessor integral to the shuffler for providing information regarding cards or hands; c) a central table gaming computer that receives information from the shuffler in real time, receives information from the sensors, and receives information from the data entry system, the associated computer, the microprocessor and the central table gaming computer communicating data among each other in real time.

The table controller will allow tracking of at least the dealer identification, the dealer efficiency and/or productivity, table usage/idle time, table location and identification, dealer errors/cheating, chip tray accounting, multi-denomination betting tracking, universal (multiple different games) progressive table games, player activity, player strategy, player win/loss activity, card counting activity, player identification (although this can be specifically performed by the main controller, as may some of the other activities, even at this stage of development), etc.

Examples of the types of data that can be captured with this system include:

- Hands dealt per unit time
- Identification of when a service call should be made
- Automatic service call generation
- Jam detection/recovery and reports of jams/clears in real time to main controller
- Rounds of play/unit time
- When cards are scanned for rank/suit, the value of the hand can be automatically ranked and the payout can be displayed, eliminating dealer errors.
- When cards are scanned for rank/suit and the correct payout is displayed, reports of dealer error/cheating are generated when wrong payouts are made.
- The signal from the bet sensors may be input into the shuffler itself to enable the shuffler to deal only the number of hands needed to cover the bets, speeding play of the game.
- The signal from the bet sensors can be transmitted directly to the central controller to collect betting data.
- The table controller will communicate with the player tracking system, permitting the system to measure player bets placed, player efficiency (how far the player deviates from "optimal" strategy), time at the table, frequency of visiting property, etc.
- The table controller will continually pole the chip tray to verify that the correct number of chips is in the tray. Count of chips on the table can also be determined by sensors and included in the total count.

Balances are fed to the central computer in real-time so that errors in paying are detected immediately.

- Data on the amount of time the table is in use, the time of day the table is in use, the table i.d. number, the table location, the times when the tables are most filled and the times when the most bets are made may be collected by the table controller and transmitted to the central controller so that management can optimize usage of personnel, the arrangement of equipment and choice of games/equipment. Management can determine when table should remain open, and when it should be closed.
- Data on a hand pitched game vs. the same game dealt through an automatic shuffler (at equivalent locations in terms of table usage/min and max bets, etc.) can be compared to measure productivity improvements gained through automating a table or automating the shuffling process.
- Dealer identification number or name may be input into the table controller at the beginning of a shift. The dealer can be asked to sign out at the end of shift. Verification of hours worked, and associating data collected during this period of time with a particular dealer. Data can be used to detect dealer cheating, dealer training needs and for implementing dealer recognition awards and special compensation for rewarding and/or recoginzing exceptionally good dealers that are reflected in higher holds and longer retention at the table.
- An identification number corresponding to the shuffler can be inputted into the table controller to track the location of each shuffler. This i.d. information can also be transmitted to the main controller directly from the shuffler or into the table computer and then to the main controller.
- Reports on shuffler swap outs (replacements when performance of a shuffler is less than optimal) can be generated, to assist service personnel in servicing the right shufflers, and to improve the chances that back-up units are in working order.
- The central controller will generate reports such as rounds of play/shift, the number of players/shift, the average amount of time spent at the table/player, the handle, player reports that assist management in determining rating of a player, analysis/reports to use for player comping, etc.
- The table controller can be programmed so that it will alert the dealer and pit boss via the central controller that a card counter is playing on the table. When the system is reading the rank and value of each card, the table controller will know the count of each hand. If player bets increase when the shoe is rich in 10 value cards, the system will alert the dealer and management that the player is counting cards.
- Data collected at each table controller can be transmitted in real time to the central controller, allowing management to thwart card counting, cheating schemes, dealer mistakes, etc. as the events occur.

In FIG. 1, is set forth the system 10 of the present invention for a game table 20 on which a live card game is played. The system 10 of the present invention can be applied to any of the following conventional game tables: Baccarat and variants such as Grand Baccarat, Mini Baccarat, Midi Baccarat, Chemin de fer and Puncto Banco; Blackjack and variants such as Progressive Twenty One, Triple Action Blackjack, Super Seven's Blackjack, Spanish Twenty One, Vingt et un and Pontoon; Big Wheel, Big Six and variants, Craps and variants, In Between and variants such as Red Dog and Catch-A-Wave; Poker and variants such as Caribbean Stud® Poker, Caribbean Draw Poker, Let It Ride® poker, Tres Card Poker, Pai Gow Poker, and Wheel and Deal; Roulette and variants such as American Roulette, Three Card Poker, French Roulette, Single Zero Roulette and Twin Roulette; and Sick Bo. The form, type, and variation of the game on table 20 is immaterial to the teachings of the present invention and does not limit the teachings contained herein.

The game table **10**, in one general exemplary embodiment, is adapted for Let It Ride Bonus ® stud poker and, in FIGURE 1, seven player positions **18a** through **18g** are shown. At each player position is a card position **19a** through **19g**, respectively, and three individual player betting positions **22a**, **22b** and **22c**. A side bet (e.g., jackpot or bonus) wagering position **23a** through **23g** is shown at each player position. A position for dealers cards **21** is shown in front of the dealer's position **20**.

A card shuffling or card randomizing device **32** is provided on, next to or beneath the upper surface of the table **10**. The shuffling device **32** preferably has its own separate computer/microprocessor **33** integral with or electronically associated with the shuffler **32**. The table controller 37 controls the operations of the shuffler in another example of the invention. A card delivery shoe **35** is shown, from which shuffled cards, randomized cards, randomized hands or shuffled hands (not shown) are provided to the dealer to distribute. A sensor **36** is shown within the card delivery shoe **35**, although it may be positioned elsewhere within the card shuffler card randomizer, as is well known in the art. A sensor or sensors (not shown) may also be positioned on the table **10** so that cards are read and information provided to one of the computers (**33**, **37** and **39**, or as later identified) to provide information for

analysis. The game computer **37** or game controller is associated with a key pad system **20**. The key pad system contains a key pad **74** (supported by attaching element **34** to the table) for entering data, various rows of buttons **72** and **78** for inputting data, and player position indicator buttons **76** for assigning data input to specific player positions (although other identification systems for individual player positions are within the choice of the ordinarily skilled artisan). The side bet wagering positions **23a** through **23g** are provided with sensing or counting devices **B** at the side bet wagering sites **23a** through **23g**. In a preferred form of the invention, the base game bet sensors **22a, 22b, 22c** are also equipped with electronic bet sensors and/or counting systems.

The bet detection device **B** (as well as the devices located at positions **22a, 22b and 22c**) may be any sensing system such as, but not limited to a proximity detector, magnetic card reader, photo-optic or acoustic detector, RF responsive indicator/sensor, optical scanner, weight sensing device or the multiple security system described in U.S. Patent No. 6,254,002. The card reader **36** is shown to be located in the shuffling device **32** of FIG. 1 on the game table **10**, but could also be located on the surface of the table **10** or any suitable location including in the shoe element **35** of the shuffler **32**, inside the shuffling device **32** when cards are moved one-at-a-time within the shuffler, or in any other strategic location near the gaming table **10**.

Any commercially available card reader, especially those adapted for the gaming industry, could be utilized under the teachings of the present invention to read player data, available credit and any other information carried on player tracking cards. Each card reader may form part of an array of card readers that are responsible for the collection of programmed data present on a card-based magnetic strip or in reading the images or other data on the cards. The present invention is not limited to magnetic or bar code card readers and it is to be expressly understood that the card utilized could be a smart card and that the device could write data into a smart card. Furthermore, any equivalent device could be utilized under the present invention which at least reads player identification data from a data medium carried by the player.

The game table computer **37** serves as an intelligent processor and communications hub for the game table **10**. The game table computer **37** contains software and coordinates all recognition, display, mathematical, diagnostic and communication routines and functions associated with the transfer of data between itself and the other table-based and distal components as will be explained in the following. The table based computer 37 also interfaces with computer-based systems (e.g., **33** and **39**) remote from the game table **10**, and in one example of the invention, also communicates with other table based computers on the property, or between properties via a network connection.

In FIG. 1 is also a dealer's keypad **20** at dealer location **14** which serves as a communication device between the dealer and the system 10 of the present invention. It enables the dealer to enter commands and/or selections of commands from predefined menus. Also at the dealer location **14** may be a dealer visual interface (not shown, may be located on the table **10** or on the shuffler **32**) that displays game information, chip tray inventories, personnel identification, casino chip values, and values summed by player position **18a** through **18g**. In addition, component status and/or miscellaneous messages from the computers **33**, **37** and **39** and/or remote computer-based systems can be displayed.

In the practice of the present invention, commercial components and subcomponents may be used to build the architecture of the system. For example, in use and operation, the invention may include processor boards, intelligent boards, unintelligent boards, a main board, microprocessors, a graphics system processor, an audio processor, the boards and components including memory in the form of ROM, RAM, flash memory, EPROM, NVRAM and/or EEPROM (electrically erasable programmable read only memory). The central gaming control computer or the table game controller computer may include a system event controller, the random number generator, a win decoder/pay table, status indicators, a communications handler, encryption system for signals, hardware and peripherals (e.g., lights, displays, buttons, coin acceptors, key switches, doors switches, change systems, credit validators, play eporting systems, currency validators, hopper controls, diverters, lamps, auxiliary outputs, printers, handles, magnetic strip readers, optical scanners, credit card

scanners, joy stick, touchpad, light wand, signal system, and other active or interactive controls). Software may be provided with any operating system, either proprietary, public, open key or closed key such as the many variations of Windows® operating systems, Mac operating systems (e.g., MAC OS), LINUX, UNIX, and the like.

The displays used on the various components may be in the form of monitors (i.e., CRT displays), plasma screens, light emitting diode (LED) panels, semiconductor displays, liquid crystal displays, and the like.

The description above is to be considered examples of the invention, and is not intended to limit the spirit or scope of the invention.

What is claimed is:

1. A method of controlling a live casino table card game; comprising:

sensing wagers by players at at least two player locations and communicating the sensing to a table game control computer in real time and communicating the sensing to a central control computer in real time;

controlling an automatic card shuffling device with a microprocessor in the card shuffling device and communicating information relating to card shuffling to the game table controller computer in real time and to the central control computer in real time;

electronically measuring betting information and transmitting information to the central game controller computer in real time, said electronic measuring including use of data transmitted to the central game controller computer from the table game controller copmputer and the shuffler.

2. The method of claim 1 wherein information transmitted from the shuffler includes at least one datum relating to completion of a shuffling event, indication of a correct number of cards in a shuffler, jam of a shuffling event, insufficient or excessive cards in a shuffling event, a count of the total number of cards in the shuffler, a count of the total number of cards in a specific area within the shuffler, number of hands dealt to active players at the table, rank of specific hands dealt at the table, hands achieving bonuses at the table, and indication of an excess of cards of specific rank and suit.

3. The method of claim 1 wherein the shuffler communicates in real time with the table game controller computer and the table game controller computer communicates to the shuffler in real time.

4. The method of claim 1 wherein the shuffler has a data port, and wherein data is fed from outside the card shuffler via the data port into the a programmable controller in the shuffler, and/or data collected by the programmable controller in the shuffler is fed outside the card shuffler via the data port.

5. The method of claim 1 wherein the table game controller computer communicates in real time to the shuffler and that communication asserts at least one control over the operation of the shuffler.

6. The method of claim 1 wherein information is provided from both the shuffler and the table game controller computer in real time to the central game computer and the central game computer identifies or records at least two events selected from the group consisting of

Hands dealt per unit time,

Identification of when a service call should be made,

Automatic service call generation,

Jam detection/recovery and reports of jams/clears,

Rounds of play/unit time,

When cards are scanned for rank/suit, the value of the hand can be automatically ranked and the payout can be displayed, eliminating dealer errors,

Results of scanning for rank/suit,

When results of scanning for rank/suit are identified or recorded, a correct payout is displayed,

When results of scanning for rank/suit is identified or recorded, a correct payout is displayed, reports of dealer error/cheating are generated when wrong payouts are made,

A signal from the bet sensors is input into the shuffler itself to enable the shuffler to deal only the number of hands needed to cover bets,

A signal from the bet sensors can be transmitted directly to the central controller to collect betting data,

The table game controller communicates with a player tracking system in the central game computer, permitting the system to measure individual player bets placed, player efficiency, individual player time at the table, frequency of individual player visiting property, and win/loss data of individual player,

The table controller continually poles a chip tray to verify the number of chips in the tray.

Count of chips on the table is determined by sensors and included in the total count poled by the table game controller,

Balances from chip movement on the table are fed to the central game computer in real-time identifying errors in payout,

Data on the amount of time an individual table is in use, the time of day an individual table is in use, specific information identifying individual tables from among a group of at least two tables, the times when the tables are most filled and the times when the most bets are made,

Dealer identification data is input into the table controller at the beginning of a shift and play at the table is directly attributed to individual players during their shifts,

Individual dealer data is evaluated by a security software program to detect dealer cheating, dealer training needs and good dealer skills,

An identification number corresponding to an individual shuffler is input into the table controller or the central game controller to track the location of each shuffler,

When individual shuffler information is input to the table game shuffler, this shuffler information is transmitted to the main controller either directly from the shuffler or into the table computer and then to the main controller,

Reports on shuffler swap outs are generated,

The central controller generates at least one report of game data with regard to rounds of play/shift, the number of players/shift, the average amount of time spent at the table/player, the handle, player reports that assist management in determining rating of a player, or analysis/reports to use for player comping,

The table controller is programmed to evaluate wagering patterns and on the basis of that analysis, alert the dealer and/or pit boss via the central controller that a card counter is playing on the table,

When the system is reading the rank and value of each card, the table controller is informed of the count or rank of each hand,

When the system has informed the table controller of the rank of each hand, specific awards are identified for each ranked hand meeting a minimum predetermined rank,

In the play of twenty-one or its variants, if at least one individual player's bets consistently increase when a shoe is rich in 10 value cards, the system will alert the dealer and management that the player may be counting cards, and

Data collected at each table controller is transmitted in real time to the central controller after being assessed according to evaluative software identifying specific stylistic wagering habits.

7. A method of controlling a live casino table card game; comprising:

Providing a live gaming table with at least two player locations and at least one sensor in each player location for sensing bets;

Providing a computer controlled automatic card shuffling device;

Providing a table game controller;

Providing a central game controller;

Electronically measuring betting information;

Wherein the card shuffling device receives game related data from and/or transmits data to the table game controller in real time and wherein the table game controller transmits and/or receives game related information in real time to and/or from the central game controller.

8. An automatic card shuffler, comprising:

A programmable controller;

A card randomizing mechanism; and

A data port;

wherein data is fed from outside the card shuffler via the data port into the programmable controller from a central game computer and/or table game computer, and/or data collected by the controller is fed outside the card shuffler via the data port to a central game computer and/or table game computer.

9. The automatic card shuffler of claim 8, wherein the data is fed in real time.

10. The shuffler of claim 2, wherein data collected by the programmable controller is fed into a programmable table game controller.

11. The shuffler of claim 2, wherein data collected by a table game controller is fed into the card shuffler.

12. The shuffler of claim 2, wherein data collected by the programmable controller is fed into a programmable central controller.

13. The shuffler of claim 2, wherein data collected by a programmable central controller is fed into the card shuffler.

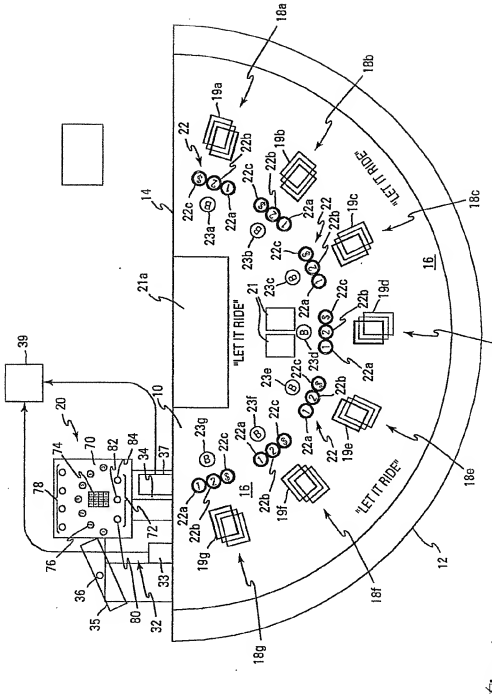
14. A security system for a casino table card game comprising:

a) a casino table with i) indicia thereon for the placement of wagers, ii) a data entry system with an associated computer, and iii) sensors that can detect the placement of at least one specific category of wager

b) a shuffling device with a microprocessor integral to the shuffler for providing information regarding cards or hands

c) a central table gaming computer that receives information from the shuffler in real time, receives information from the sensors, and receives information from the data entry system,

the associated computer, the microprocessor and the central table gaming computer communicating data among each other in real time.


"LET IT RIDE"
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16
16
12
14
21
21a
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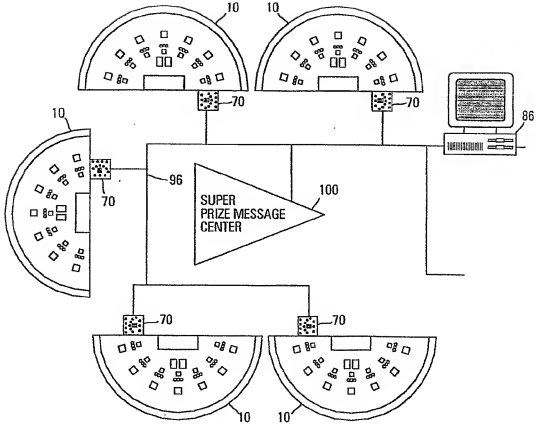
23e
23f
23g

Fig. 1


10
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86
96
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SUPER
PRIZE MESSAGE
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100
70
70
10
10

Fig. 2

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US02/31105

A. CLASSIFICATION OF SUBJECT MATTER
IPC(7) : A63F 13/00, 9/24; G06F 17/00, 19/00
US CL. : 463/29, 25, 12, 16, 42; 273/309, 274, 149R, 292
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
U.S. : 463/29, 25, 16, 42, 9-13, 40-43, 46, 47; 273/309, 274, 149R, 292, 148A, 138.1, 138.2, 139, 307

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EAST

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6,093,103 A (McCREA, JR.) 25 July 2000 (25.07.2000), see the entire reference.	1-14
X	US 6, 165,069 A (SINES et al.) 26 December 2000 (26.12.2000), see columns 1-6, 8-20, and column 24, line 20 to column 29, line 49.	1-14
X	US 6,126,166 A (LORSON et al.) 03 October 2000 (03.10.2000), see column 1, line 13 to	1-7, 10-13, 14
---	column 12, line 42; and Figures 1-9.	---
Y	US 5,722,893 A (HILL et al.) 03 March 1998 (03.03.1998), see the entire reference.	8, 9

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
26 January 2003 (26.01.2003)	06 FEB 2003
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231	Authorized officer Valencia Martin-Wallace
Facsimile No. (703)305-3230	Telephone No. 703-308-0858

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Group 3700

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G06K 17/00
G06K 19/06

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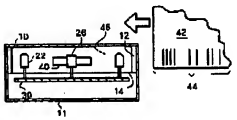
(22)Date of filing : 31.01.2001

(71)Applicant : KONAMI CO LTD
KONAMI COMPUTER ENTERTAINMENT YOKYO INC
(72)Inventor : SAKIYAMA TAKAHIRO

(54) CARD GAME SYSTEM AND CARD

(57)Abstract:
PROBLEM TO BE SOLVED: To provide a card on which information is printed without damaging design properties, and a card game system using the card as a game card.
SOLUTION: A card game system is configured by including a game card 42 on which game information is printed in a state difficult for a player to discern by ultraviolet ink (a special ink emitting fluorescent light when irradiated by a black lamp (ultraviolet rays)) for example, and a card reader 11 for reading the game information printed on the game card 42 and inputting the information to a game machine.



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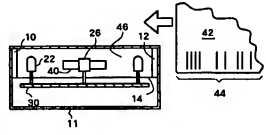
最終頁に続く

(54)【発明の名称】　カードゲームシステム及びカード

(57)【要約】
【課題】　デザイン性を損なうことなく情報を印刷したカード及び同カードをゲーム用カードとして用いたカードゲームシステムを提供する。
【解決手段】　例えば紫外線インク（ブラックランプ（紫外線）をあてると蛍光を発する特殊インク）などにより、プレイヤが肉眼で判別し難い状態でゲーム用情報が印刷されているゲーム用カード４２と、該ゲーム用カード４２に印刷されたゲーム用情報を読み取り、それをゲーム機に入力するためのカードリーダ１１と、を含んでカードゲームシステムを構成する。



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【特許請求の範囲】

【請求項１】　プレイヤが肉眼で判別し難い状態でゲーム用情報が印刷されているゲーム用カードと、

前記ゲーム用カードに印刷された前記ゲーム用情報を読み取り、それをゲーム機に入力するためのカードリーダと、

を含むことを特徴とするカードゲームシステム。

【請求項２】　請求項１に記載のカードゲームシステムにおいて、

前記ゲーム用カードは、３辺以上を有し、そのうち少なくとも１辺には、その辺に沿って少なくとも２箇所に前記ゲーム用情報が印刷されていることを特徴とするカードゲームシステム。

【請求項３】　請求項２に記載のカードゲームシステムにおいて、

前記ゲーム用カードの前記少なくとも２箇所は、全て前記ゲーム用カードの同じ面に位置していることを特徴とするカードゲームシステム。

【請求項４】　請求項２に記載のカードゲームシステムにおいて、

前記ゲーム用カードの前記少なくとも２箇所は、前記ゲーム用カードの表面及び裏面に分かれて位置していることを特徴とするカードゲームシステム。

【請求項５】　請求項２乃至請求項４のいずれかに記載のカードゲームシステムにおいて、

前記ゲーム用カードの前記少なくとも１辺に沿う前記少なくとも２箇所には、読み取り方向が異なるよう前記ゲーム用情報が印刷されていることを特徴とするカードゲームシステム。

【請求項６】　請求項２乃至請求項４のいずれかに記載のカードゲームシステムにおいて、

前記ゲーム用カードの前記少なくとも１辺に沿う前記少なくとも２箇所には、読み取り方向が同じとなるよう前記ゲーム用情報が印刷されていることを特徴とするカードゲームシステム。

【請求項７】　請求項１乃至請求項６のいずれかに記載のカードゲームシステムにおいて、

前記ゲーム用カードは、３辺以上を有し、そのうち少なくとも２辺には、それらの辺に沿ってそれぞれ少なくとも１箇所に前記ゲーム用情報が印刷されていることを特徴とするカードゲームシステム。

【請求項８】　請求項７に記載のカードゲームシステムにおいて、

前記ゲーム用カードの前記少なくとも２辺に沿う前記少なくとも１箇所は、全て前記ゲーム用カードの同じ面に位置していることを特徴とするカードゲームシステム。

【請求項９】　請求項７に記載のカードゲームシステムにおいて、

前記ゲーム用カードの前記少なくとも２辺に沿う前記少なくとも１箇所は、前記ゲーム用カードの表面及び裏面

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に分かれて位置していることを特徴とするカードゲームシステム。

【請求項１０】　請求項１乃至請求項１０のいずれかに記載のカードゲームシステムにおいて、

前記ゲーム用カードには、少なくとも２つの異なる情報が前記ゲーム用情報として印刷されていることを特徴とするカードゲームシステム。

【請求項１１】　３辺以上を有し、そのうち少なくとも１辺には、その辺に沿って少なくとも２箇所に肉眼で判別し難い状態で機械読み取りが可能な情報が印刷されていることを特徴とするカード。

【請求項１２】　３辺以上を有し、そのうち少なくとも２辺には、それらの辺に沿ってそれぞれ少なくとも１箇所に肉眼で判別し難い状態で機械読み取りが可能な情報が印刷されていることを特徴とするカード。

【請求項１３】　肉眼で判別し難い状態で少なくとも２箇所に異なる情報が機械読み取りが可能なよう印刷されていることを特徴とするカード。

【発明の詳細な説明】

【０００１】

【発明の属する技術分野】本発明はカードゲームシステム及びカードに関し、特に肉眼で判別し難い状態で機械読み取り可能な情報を印刷したカード、及びそれを用いるカードゲームシステムに関する。

【０００２】

【従来の技術】トレーディングカードなどの各種ゲーム用カードが子供達の人気を集めている。こうしたゲーム用カードの中には、カードのＩＤ番号が小さく印刷されていて、このＩＤ番号を該ゲーム用カードに関連したゲームソフトウェア（ゲーム機）に入力することで、例えばカードに印刷されているゲームキャラクタを同ゲームソフトウェアに登場させるようにするなど、ゲームソフトウェアに特別な動作をさせることができるようになったものがある。こうしたシステムによれば、ゲーム用カード或いはゲームソフトウェアの遊び方の幅を広げることができ、ゲームの魅力をさらに高めることができる。

【０００３】

【発明が解決しようとする課題】しかしながら、上述のようにゲーム用カードに印刷されたＩＤ番号をゲームソフトウェアに入力するのは煩雑である。また、ＩＤ番号を不正に知り得た者までが、ゲームソフトウェアに特別な動作をさせることができるようになってしまうという問題もある。この点、ゲーム用カードにバーコードを印刷し、それをバーコードリーダによって読み取ってゲームソフトウェアに入力できるようにすれば、こうした問題をある程度解消することができる。しかしながら、バーコードをゲーム用カードに印刷すると、ゲーム用カードからゲームキャラクタなどの印刷領域が狭まってしまい、カードのデザイン性を損なうという問題がある。

【０００４】本発明は上記課題に鑑みてなされたもので

あって、その目的は、デザイン性を損なうことなく情報を印刷したカード、及び同カードをゲーム用カードとして用いたカードゲームシステムを提供することにある。

【０００５】

【課題を解決するための手段】上記課題を解決するために、本発明に係るカードゲームシステムは、プレイヤが肉眼で判別し難い状態でゲーム用情報が印刷されているゲーム用カードと、前記ゲーム用カードに印刷された前記ゲーム用情報を読み取り、それをゲーム機に入力するためのカードリーダと、を含むことを特徴とする。

【０００６】本発明によれば、ゲーム用カードに例えば紫外線インク（ブラックランプ（紫外線）をあてると蛍光を発する特殊インク）などにより肉眼で判別し難い状態でゲーム用情報が印刷される。ゲーム用情報は例えばバーコード形式などで印刷される。そして、このゲーム用情報はカードリーダにより読み取られ、ゲーム機に入力される。こうすれば、デザイン性を損なうことなくゲーム用情報をゲーム用カードに印刷することができる。

【０００７】本発明の一態様では、前記ゲーム用カードは、３辺以上を有し、そのうち少なくとも１辺には、その辺に沿って少なくとも２箇所に前記ゲーム用情報が印刷されていることを特徴とする。こうすれば、ゲーム用カードからゲーム用情報をより確実に読み出すことができるようになる。

【０００８】この態様においては、前記ゲーム用カードの前記少なくとも２箇所は、全て前記ゲーム用カードの同じ面に位置するようにしてもよいし、前記ゲーム用カードの表面及び裏面に分かれて位置するようにしてもよい。

【０００９】また、前記ゲーム用カードの前記少なくとも１辺に沿う前記少なくとも２箇所には、読み取り方向が異なるよう前記ゲーム用情報が印刷されるようにしてもよい。こうすれば、いずれの方向に読み取らせたとしても、ゲーム用カードから正しくゲーム用情報を読み取ることができるようになる。

【００１０】或いは、前記ゲーム用カードの前記少なくとも１辺に沿う前記少なくとも２箇所には、読み取り方向が同じとなるよう前記ゲーム用情報が印刷されるようにしてもよい。こうすれば、読み取りの開始位置がずれたとしても、ゲーム用カードから正しくゲーム用情報を読み取ることができるようになる。

【００１１】また、本発明の一態様では、前記ゲーム用カードは、３辺以上を有し、そのうち少なくとも２辺には、それらの辺に沿ってそれぞれ少なくとも１箇所に前記ゲーム用情報が印刷されていることを特徴とする。こうすれば、ゲーム用カードからゲーム用情報をより確実に読み出すことができるようになる。

【００１２】この態様においては、前記ゲーム用カードの前記少なくとも２辺に沿う前記少なくとも１箇所は、全て前記ゲーム用カードの同じ面に位置するようにしてもよいし、前記ゲーム用カードの表面及び裏面に分かれて位置するようにしてもよい。

【００１３】また、本発明の一態様では、前記ゲーム用カードには、少なくとも２つの異なる情報が前記ゲーム用情報として印刷されていることを特徴とする。こうすれば、読み取り箇所によって異なるゲーム用情報がゲーム機に入力されるようになり、ゲームの面白さを増すことができる。

【００１４】また、本発明に係るカードは、３辺以上を有し、そのうち少なくとも１辺には、その辺に沿って少なくとも２箇所に肉眼で判別し難い状態で機械読み取りが可能な情報が印刷されていることを特徴とする。本発明によれば、例えば紫外線インクなどにより肉眼で判別し難い状態で情報が印刷される。この情報は例えばカードリーダによって機械的に読み取り可能である。このカードは３辺以上を有し、そのうち少なくとも１辺に沿って少なくとも２箇所に情報が印刷されているので、より確実にカードから情報を読み取ることが可能となる。

【００１５】また、本発明に係るカードは、３辺以上を有し、そのうち少なくとも２辺には、それらの辺に沿ってそれぞれ少なくとも１箇所に肉眼で判別し難い状態で機械読み取りが可能な情報が印刷されていることを特徴とする。本発明によれば、例えば紫外線インクなどにより肉眼で判別し難い状態で情報が印刷される。この情報は例えばカードリーダによって機械的に読み取り可能である。このカードは３辺以上を有し、そのうち少なくとも２辺に沿ってそれぞれ少なくとも１箇所に情報が印刷されているので、より確実にカードから情報を読み取ることが可能となる。

【００１６】また、本発明に係るカードは、肉眼で判別し難い状態で少なくとも２箇所に異なる情報が機械読み取りが可能なよう印刷されていることを特徴とする。本発明によれば、例えば紫外線インクなどにより肉眼で判別し難い状態で情報が印刷される。この情報は例えばカードリーダによって機械的に読み取り可能である。このカードには少なくとも２箇所に異なる情報が印刷されているので、読み取り箇所によって異なる情報を読み出すことができるようになり、例えばゲーム用カードなどに好適な意外性のあるカードとすることができる。

【００１７】

【発明の実施の形態】以下、本発明の好適な実施の形態について図面に基づき詳細に説明する。

【００１８】図１は本発明の一実施の形態に係るカードゲームシステムに用いられるカードリーダの上面図であり、図２はその正面図、図３はその右側面図である。また、図４は図３のＡ－Ａ線における断面図であり、図５は図１のＢ－Ｂ線における断面図である。図５には、カードリーダ１１にゲーム用カード４２を挿入する様子も示されている。

【００１９】これらの図に示すように、カードリーダ１

１の上面には対向するカード通路壁４６，４８によってカード通路１４が形成されており、同カード通路１４にゲーム用カード４２を通すことができるようになっている。カード通路１４の両端にはカード挿入部１０，１２が設けられており、ゲーム用カード４２を挿入し易いよう通路幅が他の部分よりも広く形成されている。同カードリーダ１１にはコントローラケーブル１６の一端が取り付けられており、図示しない他端にコネクタが取り付けられていて、周知の家庭用ゲーム機に接続可能となっている。カード通路１４にゲーム用カード４２が通されると、そこに印刷されたゲーム用情報が読み取られ、コントローラケーブル１６を介して家庭用ゲーム機に入力されるようになっている。家庭用ゲーム機ではゲーム用カード４２の関連ゲームソフトウェアが実行されており、同ソフトウェアによってゲーム用カード４２に印刷されているゲーム用情報を用いたゲーム処理が実行される。なお、ゲーム用情報とは、例えば同カードの種類等の情報である。

【００２０】カードリーダ１１の筐体内部には基板３０が取り付けられており、同基板３０にはカード検知用光センサ１８，２０と、カード検知用投光ＬＥＤ２２，２４と、情報読み取り用光センサ２６と、紫外線ランプ（ブラックランプ）２８とが載置されている。カード検知用光センサ１８とカード検知用投光ＬＥＤ２２はカード挿入部１０に近い位置に対向配置されており、カード通路壁４６及び４８の対向位置にそれぞれ開設されている小孔３２，３６を通し、カード検知用投光ＬＥＤ２２から発せられる光がカード検知用光センサ１８によって検知されるようになっている。そして、ゲーム用カード４２が小孔３２，３６の前方を通過するとき、カード検知用投光ＬＥＤ２２からカード検知用光センサ１８に入射する光が遮られ、それにより同位置にゲーム用カード４２が存在することが検知されるようになっている。同様に、カード検知用光センサ２０とカード検知用投光ＬＥＤ２４はカード挿入部１２に近い位置に対向配置されており、カード通路壁４６及び４８の対向位置にそれぞれ開設されている小孔３４，３８を通し、カード検知用投光ＬＥＤ２４から発せられる光がカード検知用光センサ２０によって検知されるようになっている。そして、ゲーム用カード４２が小孔３４，３８の前方を通過するとき、カード検知用投光ＬＥＤ２４からカード検知用光センサ２０に入射する光が遮られ、それにより同位置にゲーム用カード４２が存在することが検知されるようになっている。

【００２１】また、カードリーダ１１には図示しない制御回路が設けられており、同回路により、カード検知用光センサ１８及びカード検知用投光ＬＥＤ２２のペアによってゲーム用カード４２がカード挿入部１０からカード通路１４に差し入れられたこと、又はカード検知用光センサ２０及びカード検知用投光ＬＥＤ２４のペアによってゲーム用カード４２がカード挿入部１２からカード通路１４に差し入れられたことが検知されると、紫外線ランプ２８が点灯するようになっている。紫外線ランプ２８は点灯してから所定時間後に消灯するようになっている。カード検知用光センサ１８及びカード検知用投光ＬＥＤ２２のペア、又はカード検知用光センサ２０及びカード検知用投光ＬＥＤ２４のペアによってゲーム用カード４２がカード通路１４から引き抜かれたことが検知されると、紫外線ランプ２８を消灯させるようにしてもよい。

【００２２】ゲーム用カード４２には図５に示すように１辺に沿ってゲーム用情報が印刷されている。ゲーム用情報は、例えば周知のバーコード印刷技術を用い、ゲーム用カード４２に印刷することができる。また、ゲーム用情報は紫外線を照射すると蛍光（可視）を発する特殊インキ（例えば十条ケミカル株式会社製のコロセルＢＬ（商標）などの機能性色素インキ）により、肉眼では判読不能なようにして印刷されている。なお、同図では説明のためゲーム用情報を可視的に描いている。

【００２３】上述のようにゲーム用カード４２がカード通路１４に進入すると、紫外線ランプ２８が点灯する。そして、紫外線ランプ２８から発せられる紫外光は、通路壁４６に開設された開口４０を通し、カード通路１４における開口４０の前方まで進入してきたゲーム用カード４２のゲーム用情報を印刷した箇所に照射される。

【００２４】カード用情報の印刷箇所に紫外光が照射されると、上述したインクの特殊機能によってゲーム用情報（バーコード）が蛍光を発する。この蛍光は情報読み取り用受光センサ２６によって検知され、その出力は基板３０に載置された図示しない処理回路により、例えば２値情報に変換するなどの処理が施され、コントローラケーブルを介して家庭用ゲーム機に入力される。

【００２５】次に、ゲーム用カード４２にゲーム用情報を印刷するときの印刷箇所について説明する。

【００２６】図６は、最も簡素な態様を示している。同図に示すゲーム用カード４２では表面に、下辺に沿って中央より左側にゲーム用情報の印刷箇所５０ａが設けられている。印刷箇所５０ａに印刷されるゲーム用情報は、ゲーム用カード４２の左下隅から下辺中央に向かって読み取り方向が設定されたものである。同図において矢印はゲーム用情報の読み取り方向を示している（以下、同じ。）。なお、表面と同様にして、裏面にも印刷箇所５０ａ（場所は異なってもよい）を設けるようにしてよい。

【００２７】同図において、ゲーム用情報の印刷箇所５０ａ以外の箇所には、ゲームキャラクタの絵やそのゲームキャラクタに関する情報など、様々な絵柄や文字が印刷される。また、絵や文字をゲーム用カード４２の印刷箇所５０ａに印刷した後、同じ箇所にゲーム用情報を上書き印刷するのであれば、印刷箇所５０ａにも絵や文字

等を印刷してもよい。

【００２８】次に示す図７は、図６に示す印刷箇所５０ａに加え、ゲーム用カード４２の表面に、下辺に沿って中央より右側にゲーム用情報の印刷箇所５０ｂが設けられている。印刷箇所５０ｂに印刷されるゲーム用情報は、ゲーム用カード４２の右下隅から下辺中央に向かって読み取り方向が設定されたものである。同図に示すように、ゲーム用カード４２の１辺に沿って、読み取り方向が異なるゲーム用情報を２箇所に印刷するようにすれば、ゲーム用カード４２をカードリーダ１１にいずれの向きから（カード挿入部１０又は１２のいずれから）進入させても、正しくゲーム用情報を読み取れるようになり、確実にゲーム用情報をゲーム機に入力させることができるようになる。このとき、印刷箇所５０ａと印刷箇所５０ｂとに同じ情報を印刷すると（バーコードの場合、両者は線対称となる）、ゲーム用カード４２をカードリーダ１１にいずれの向きから進入させても、同じ情報をゲーム機に入力させることができる。逆に、印刷箇所５０ａと印刷箇所５０ｂとに異なる情報を印刷すると、ゲーム用カード４２をカードリーダ１１に差し入れる向きにより、異なる情報をゲーム機に入力させることができる。例えば、このようにゲーム用カード４２に異なる情報が印刷されていることをプレイヤに秘して同ゲーム用カード４２を配布すれば、差入れ方向によってゲーム機に入力される情報が異なるので、カードゲームシステムに意外性を与えることができ、ゲームの楽しさを増加させることができる。なお、表面と同様にして、裏面にも印刷箇所５０ａ又は５０ｂのうち少なくとも一方を設けるようにしてもよい。

【００２９】また、図８に示すように、さらにゲーム用カード４２の上辺にゲーム用情報の印刷箇所５０ｃ及び５０ｄを設けるようにしてもよい。こうすれば、ゲーム用カード４２を逆さまにして上辺がカードリーダ１１のカード通路１４に通されたとしても、ゲーム用情報を読み取ることができる。このとき、印刷箇所５０ａ～５０ｂには同じ情報を印刷してもよいし、異なる情報を印刷してもよい。上辺と下辺とで異なる情報を印刷した場合、ゲーム用カード４２を普通にカードリーダ１１に差し入れたときと、逆さまに差し入れたときとで、異なる情報がゲーム機に入力されるようになり、例えばタロットカード占いを題材としたゲームシステムに好適なカードとすることができる。また、図９に示すように、印刷箇所５０ａと印刷箇所５０ｂに読み取り方向が同じゲーム用情報を印刷してもよい。同様に、印刷箇所５０ｃと印刷箇所５０ｄに読み取り方向が同じゲーム用情報を印刷してもよい。こうすれば、ゲーム用カード４２を四隅からカードリーダ１１に進入させなくても、ゲーム用情報を読み取ることができるようになる。なお、表面と同様にして、裏面にも印刷箇所５０ａ～５０ｄのうちいずれか少なくとも１つを設けるようにしてもよい。

【００３０】さらに、図１０に示すように、ゲーム用カード４２の左辺及び右辺にもそれぞれゲーム用情報の印刷箇所５０ｅ、５０ｆを設けるようにしてもよい。また、図１１に示すように、左辺及び右辺にも、下辺及び上辺と同様、ゲーム用情報の印刷箇所を複数（印刷箇所５０ｅ～５０ｈ）設けるようにしてよい。この場合も、表面と同様にして、裏面にも印刷個所５０ａ～５０ｈのうちいずれか少なくとも１つを設けるようにしてもよい。

【００３１】以上のようにすれば、特殊インキによってゲーム用情報がプレイヤの肉眼で判別し難いように印刷されるので、ゲーム用カード４２のデザイン性を損なわないようにできる。また、ゲーム用カード４２の複数箇所にゲーム用情報を印刷すれば、肉眼で判別し難くても、ゲーム用情報を確実にカードリーダ１１に読み取らせることができるようになる。また、１枚のゲーム用カード４２に複数ゲーム用情報を印刷し、そのうちいくつかを異なるものとしておけば、読み取り箇所によって異なる情報をゲーム機に入力できるようになり、ゲーム性をさらに高めることができるようになる。

【００３２】なお、本発明は以上説明した実施の形態に限定されるものではない。

【００３３】例えば、ゲーム用カード４２にゲーム用情報を印刷するインクは肉眼で判別が困難であるものであれば、どのようなものでも利用可能であり、紫外線や赤外線などの入射光に対して可視又は不可視の蛍光や反射光を発するインクなど、様々なものが利用可能である。カードリーダ１１の紫外線ランプ２８及び情報読み取り用センサ２６はインクの種類に応じて取り替えられる。

【００３４】さらに、ゲーム用カード４２にゲーム用情報を磁気的に記録するようにしてもよい。この場合、ゲーム用カード４２にゲーム機等からデータ書き込みも可能となる。こうすれば、例えばロールプレイングゲームにおけるゲームキャラクタの成長や各種ゲームの進行状況を記録することが可能となる。また、ゲーム用カード４２の元々の記録内容を更新することもできる。さらに、ゲーム用カード４２の使用回数を記録することもでき、使用回数に制限を設けることも可能となる。

【００３５】また、以上の説明ではゲーム用カード４２に肉眼での判別が困難な状態でゲーム用情報を印刷する例を取り上げたが、クレジットカード、会員カード、ポイントカードなど、あらゆるカードに本発明は適用可能である。

【００３６】

【発明の効果】以上説明したように、本発明では肉眼で判別し難い状態で情報がカードに印刷されるので、例えばゲームなどに用いられる各種カードのデザイン性を損なわないようにできる。

【図面の簡単な説明】

【図１】　本発明の実施の形態に係るカードリーダの上

面図である。

【図２】　本発明の実施の形態に係るカードリーダの正面図である。

【図３】　本発明の実施の形態に係るカードリーダの右側面図である。

【図４】　図３のＡ－Ａ線における断面図である。

【図５】　図１のＢ－Ｂ線における断面図である。

【図６】　ゲーム用カードにおける情報印刷箇所を説明する図である。

【図７】　ゲーム用カードにおける情報印刷箇所を説明する図である。

【図８】　ゲーム用カードにおける情報印刷箇所を説明する図である。

【図９】　ゲーム用カードにおける情報印刷箇所を説明する図である。

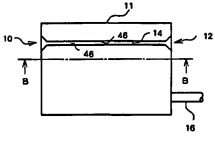
＊【図１０】　ゲーム用カードにおける情報印刷箇所を説明する図である。

【図１１】　ゲーム用カードにおける情報印刷箇所を説明する図である。

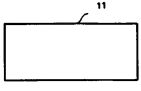
【符号の説明】

１０，１２　カード挿入部、１１　カードリーダ、１４　カード通路、１６コントローラケーブル、１８，２０　カード検知用光センサ、２２，２４　カード検知用投光ＬＥＤ、２６　情報読み取り用光センサ、２８　紫外線ランプ、３０　基板、３２，３４，３６，３８　小孔、４０　開口、４２　ゲーム用カード、４４　不可視バーコード（ゲーム用情報）、４６，４８　カード通路壁、５０ａ～５０ｆ　情報印刷箇所（図中、矢印は情報の読み取り方向である。）。

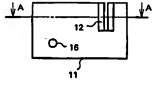
【図１】



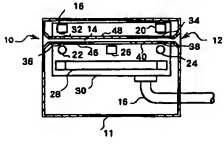
【図２】



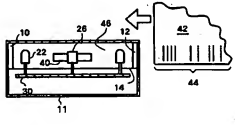
【図３】



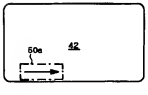
【図４】



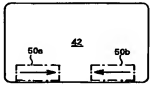
【図５】



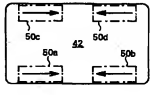
【図６】



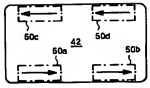
【図７】



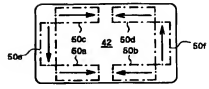
【図８】



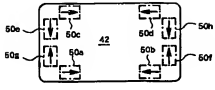
【図９】



【図１０】



【図１１】



フロントページの続き

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